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Journal of the Society of Arts.

FRIDAY, APRIL 8, 1859.

NOTICE TO LOCAL BOARDS.

Forms No. 1 and No. 2 (see Appendix to the Examination Programme) have been issued to the Secretary of each Local Board, and careful attention to them is particularly requested.

EXAMINATIONS, 1861. — LOCAL BOARDS.

The following Local Boards have been appointed since the last announcement:—

FOR BLANDFORD.

Mr. Spence Abbott.
Mr. Edward Fisher.
Mr. Wellington E. Groves.
Mr. James B. Green, Blandford Institution, *Secretary*.

FOR CANTERBURY.

The Very Rev. the Dean of Canterbury.
The Rev the Sub-Warden of St Augustine's College.
Rev. J. B. Kearney.
Rev. E. R. Orger.
Monsieur L. L. Razé.
Mr. James Reid.
Rev. E. Gilder, Canterbury, *Secretary*.

FOR CARLISLE.

Mr. Joseph Barnes, Schoolmaster.
Rev. Wm. Bell, M.A., Head Master of the Cathedral Grammar School.
Rev. J. G. Doman, M.A., Second Master of the Cathedral Grammar School.
Rev. T. G. Livingston, M.A., Minor Canon, Carlisle Cathedral.
Mr. James Barnes, Church of England Religious and General Literary Association, Carlisle, *Secretary*.

FOR THE ROYAL POLYTECHNIC INSTITUTION CLASSES, LONDON.

Dr. White, *Chairman*.
Mr. J. P. Bidlake, B.A., F.C.P.
Mr. E. V. Gardner.
Mr. H. Hagrom.
Mr. J. C. Buckmaster, *Secretary*.

EXAMINATION PRIZE FUND FOR 1859.

The following are the Donations up to the present date:—

	£	s.
John Ball, Examiner in Book-keeping (2nd donation).....	5	5
Harry Chester, Vice-Pres. (2nd donation)...	5	0
C. Wentworth Dilke, Vice-Pres., Chairman of Council (4th donation).....	10	10
T. Dixon.....	1	1
Frederick Edwards (annual)	1	1
J. G. Frith, Mem. of Council (2nd donation)	5	5
F. Seymour Haden (annual)	2	2

— Haldimand	10	10
Edward Highton (annual)	2	2
James Holmes (annual)	1	1
Henry Johnson (2nd donation)	25	0
London Committee of the Oxford Middle Class Examinations	5	5
Charles Ratchiff (annual)	10	10
Rev. Dr. Temple	6	6
Matthew Uzielli	50	0
Rev. A. Wilson	2	2

CONVERSAZIONI.

The Council have arranged for two *Conversazioni* during the present Session; the first, on Saturday, the 7th May, at the Society's House, the card for which will admit the Member only; the second, on Saturday, the 28th May, at the South Kensington Museum, the card for which will admit the Member and two ladies, or one gentleman.

PRIZE WRITING CASE.

The Prize of Twenty Pounds (placed at the disposal of the Council of the Society of Arts by the Rev. F. Trench and J. MacGregor, Esq.,) and the Society's Silver Medal, offered for a Writing Case suited for the use of soldiers, sailors, emigrants, &c., have been awarded to Messrs. Parkins and Gotto, of Oxford-street.

When the announcement of the offer of the Prize was first made, sixty-two Writing Cases were sent in for competition, but the Committee appointed by the Council to report thereon, came unanimously to the conclusion that none of them showed sufficient merit to justify the Council in awarding the Prize.

The Council then decided to invite further competition, and issued the following conditions:—

1. *Weight*.—None will be received weighing above five ounces when empty.
2. *Size*.—The size in length and breadth must not exceed that necessary to hold note paper.
3. *Ink*.—The case must not contain ink in a fluid state.
4. *Durability*.—It must be made of a substance not liable to be spoiled by wet, and which will protect the contents from injury.
5. *Cheapness*.—The retail price, with guaranteed supply, must not exceed 1s. 6d.

In reply to this announcement, twenty-eight writing cases were sent in, and after careful examination, the committee reported in favour of a case, manufactured in accordance with the above conditions, by Messrs. Parkins and Gotto.

The retail price of the case will be 1s. 6d., and the contents, consisting of envelopes, note-paper, an indelible pencil, four pens and a pen-holder, will be supplied at an additional cost not exceeding sixpence.

EIGHTEENTH ORDINARY MEETING.

WEDNESDAY, APRIL 6, 1859.

The Eighteenth Ordinary Meeting of the One Hundred and Fifth Session was held on Wednesday, the 6th inst., Peter Graham, Esq., Member of the Council, in the chair.

The following candidates were balloted for and duly elected members of the Society:—

Abinger, Lord | Nissen, Hilary Nicholas
Stevens, James John

The following Institution has been taken into Union since the last announcement:—

Rugby, Institute.

The Paper read was—

ON EMBROIDERY BY MACHINERY.

BY GEORGE WALLIS.

The object of this paper is simply to give a popular description of the leading features of the embroidering machine, and to illustrate its practical use and capabilities by specimens of textile decoration produced by it. A full and complete description of this machine would involve either the presence of a machine in full work, or such a series of elaborate drawings, diagrams, or models, as would render the task of description neither pleasant nor profitable. No attempt, therefore, will be made to do more than simplify the principle upon which the machine is constructed, and give such illustrations of its action and capabilities as may serve to show its superiority over, or indicate its inferiority to, the human hand in the production of embroidered effects. The diagrams used will be such simplifications of construction as will be best calculated to render that construction intelligible, and are in no way intended as illustrations of the complete mechanical structure of the parts described, or of their full action.

As an interesting branch of art-industry, embroidery by machinery is more wondered at than understood, and it is no uncommon thing to find the mechanical agent used in its production confounded with the various sewing machines which have recently come so largely into use for a variety of purposes. Machine embroidery may, as it did some ten or twelve years ago, stimulate the productions of hand embroidery, and, to a certain extent, supplement them, but it is doubtful, to say the least, if it can ever supplant them. Excelling hand embroidery in accuracy of repetition, and in the production of the same design on both sides of the fabric decorated, it is limited in its range, alike as regards subject and the article to which it can be applied.

In variety of effect it can never compete with hand-embroidery, and, although, as in the dress embroidered for Her Majesty, by the late Mr. Louis Schwabe, of Manchester, the effects of the original drawing are given in all their variety, this has only been done at a great sacrifice of all the economic powers of the machine. When Mr. Schwabe first showed me this specimen in 1844, he said, "I was written to and asked if my machines would execute any design? I replied that any design which Her Majesty wished executed should be produced by them. When the drawing came I saw the mistake I had made, but resolved, cost what it might, that the work should be done, and there it is." As an illustration of what can be done by the embroidering machine, the example is interesting, but as an illustration of its economic use, or its superiority over hand embroidery, it is worthless.

Having said thus much as to the true purposes of machinery as applied to embroidery, it may be useful

to make a few introductory remarks on the subject of embroidery as an art of so ancient a character, that its origin is entirely lost.

The early history of embroidery is associated with the progress of civilisation and refinement as an elegant employment for females; and one which, from a remote antiquity, exercised a large and abiding influence on ornamental art. It is the most primitive mode of textile decoration, and ranges at once from the simplest figure to the most intricate elaborations of a variety of materials requiring the skill of the needlewoman, with the invention of the ornamentalist. It is practised in one form or another wherever man has made any advance beyond the rude art of ornamenting his body by tattooing. The wonderful embroidery of the Peruvians, which so astonished their Spanish invaders, displayed surprising effects of colour produced by the plumage of tropical birds, combined with threads of gold and silver. In all periods of the world's history, among the richest specimens of ornament dedicated to the service of ceremonial religion, we always find embroidery. In the Mosaic Tabernacle the embroidery of purple, blue, and scarlet was conspicuous, and the elaborate embroidery of sacerdotal vestments, especially those of the high priest, show how largely this sacrificial ornamental work was used in the early ceremonials of the Jews.

In the last chapter of the Proverbs of Solomon is an interesting picture of the virtuous wife, whose "Lamp goeth not out by night," and who "worketh beautiful vestments for herself,"—

Her clothing is fine linen and purple.
Her husband is known in the gates,
When he sitteth among the elders of the land.
She maketh him fine linen and selleth it;
And delivereth girdles unto the merchant.

Verses 22, 23, 24.

In the prophecy, by Ezekiel, embroidery is mentioned as the clothing of Jerusalem, represented under the figure of a woman.

"I clothed thee also with embroidered work."

Chap. 16, verse 10.

"Thou wast decked with gold and silver;
And thy raiment was of fine linen, and silk, and embroidered work."
Verse 13.

The Egyptians used embroidery to a very great extent. The sails of their boats were of embroidered linen, and the wrappings of their dead were frequently thus decorated.

The Greeks attributed the invention to Minerva. Homer describes two of his heroines as engaged in embroidery—Helen, as depicting the combats of the Trojan war, and Andromache,—

"In the chamber at the palace top,
A splendid texture wrought on either side,
All dazzling bright, with flowers of various hues."

The women of Sidon are said to have been noted for their skill in embroidery even before the period of the Trojan war. Pliny attributes its invention to the Phrygians, hence the Roman name for embroidered garments, —*Vestes Phrygionæ*.

It should be understood, however, that the word signifying "embroidery" is used by ancient writers as a generic term for all kinds of decorative work done by the needle. In later periods, the sense was limited to peculiar effects produced by certain fixed methods, and in more modern times a still greater limit is understood.

The practice of embroidery in Europe was very largely extended during the mediæval periods, and was carried to great perfection for the personal adornment of royalty, the nobility, and especially in the service of the church. The vestments of the priesthood, hangings, veils, canopies, curtains, and other textile articles of use and decoration, were largely embroidered; indeed, the character of the work of this period was chiefly ecclesiastical, and the inmates of convents em-

played their time in this direction with remarkable results. Some of the most valuable illustrations of the manners and costumes of past ages have come down to us through the agency of the needle; and in proof of this it will be sufficient here to allude to those interesting records in embroidered work and tapestry, as coverings for the walls of rooms, and hangings for doors, windows, and corridors, in the execution of which the ladies of noble families beguiled their leisure hours. Family traditions, historical incidents, portraits, the sports of the field, and groups of natural objects, were all employed in the execution of textile ornaments for the decoration of apartments. In England this art was carried to a high degree of perfection, and in the execution of vestments, English work was so highly prized as to have been constantly sent out to Rome by command of the Pope. There can be little doubt that the skill in embroidered work displayed by our ancestors was the forerunner of several of our most common kinds of ornamentation. Paper hangings for instance, were originally professed imitations of tapestry, the patterns having been first printed on canvas.

Ancient embroidery is divisible into three heads:—“*Low*” embroidery, in which the threads are laid flat on the ground of the work: “*Raised*” embroidery, in which the figures are brought into relief, and rounded by means of wool, cotton, parchment, or paper placed beneath the needle-work: “*Gimped*” embroidery, in which the figures are formed by cords of gold, silver, or silk, and portions of velvet or satin, gold and silk.

Hand embroidery is still extensively practised in the East. The true Indian and Persian scarfs are embroidery work of floss, or untwisted silk, and exceedingly rich effects are thus produced, as will be remembered by those who examined the Indian productions of this class in the Great Exhibition of 1851.

In Turkey and Greece embroidery with gold and silver thread, or richly-coloured cottons, silks, and velvets, is much used for robes and decorations. The embroideries exhibited by Turkey, in the Great Exhibition of 1851, were of a marvellous character in execution, and deserved much more attention than it is to be feared they received. As Commissioner of one of the groups of Juries, I had to direct attention to them, and in the midst of so much that was excellent, the difficulty lay in selecting those most worthy of reward. The articles embroidered were all made up for use as clothing, and the jury for that class had therefore to undertake the work of adjudication. Such was the difficulty of selection, that the task was nearly abandoned in despair, and nothing but an urgent demand on my part that so remarkable a display should have full justice done to it, induced the jury to proceed. From the system adopted by the Turkish authorities in collecting and registering the works, some of the best had to be passed over, and the jury finally reported:—“It is impossible to recognise, either by medal or honourable mention, many of those to whom such distinctions are justly due, as no names are given whereby the jury can take cognizance of the articles. Those cases which the jury have been enabled to recognise are selected as much for the facility for giving such recognition, as for the high merit displayed in the production, inasmuch as there are others deserving of the same consideration, could the jury have discriminated amid the vast collection of articles.” The awards are curious, and all to women, except a prize medal to the Tailors’ Association of Janina, for Albanian costumes. Whether the daughter of the Turkish gentleman with an unpronounceable name ever received the awarded medal, or the girls Bukudgy and Istche, or the wives of Carabet and Tezy got information of the “honourable mention” made of their embroideries, is a matter of speculation to this hour with those who desired to do them justice.

Probably the finest modern examples of pure embroidery in silk, unmixed with gold and silver thread,

pearls or precious stones, are executed by the Chinese. Not only in execution, but in design and the fitness of the forms of the ornament to the material and purpose, the embroideries of the Chinese generally exhibit a great superiority to the usual examples of European skill. The extreme care taken with the work, especially in the more costly specimens, renders them very instructive examples of textile decoration. From 700 to 750 stitches may be counted in the space of a square inch. Some years ago I took the trouble to dissect some of the best examples I could meet with, and the more closely they were examined the more marvellous the work appeared. Some diagrams now before you show the peculiarities of treatment, and illustrate in some degree the arrangement of the stitches.

Of course, the leading Continental nations are producers of embroidery, especially France, but the styles adopted are usually either a reproduction of the ancient methods or imitations of Eastern productions.

This brief sketch of the progress of embroidery by hand, must suffice to introduce the special subject before us,

EMBROIDERY BY MACHINERY.

This has been effected to a considerable extent by the Jacquard and Draw looms, or, rather, effects in imitation of embroidery have been produced. With this, however, we have nothing to do, as machine embroidery, by the legitimate means of the needle, is the point which it is desired to explain and illustrate.

The first idea of the embroidering machine originated with M. Josué Heilmann, of Mulhouse. His object was to combine accuracy of repetition over a large surface with economy of production. Selling it to Messrs. Koechlin, also of Mulhouse, he developed the principle of its construction in their establishment, where it was first practically applied to manufactures. The invention appears to have been first brought before the public in the National Exposition of the Products of Industry, at Paris, in 1834; but the machine was patented for England about 1829, and with all rights, &c., purchased from Messrs. Koechlin by Mr. Henry Houldsworth, of Manchester, by whom it was subsequently very greatly improved from time to time. The first successful use of the machines as improved was in the silk manufactory of the late Mr. Louis Schwabe, in the then Portland-street Mill, Manchester; Mr. Houldsworth having made an arrangement with Mr. Schwabe, as a manufacturer in whose trade their powers would find most development. Here they were employed in embroideries for upholsterers, but chiefly in the “sprigging” of waistcoatings, to which they were peculiarly adapted, as will be shown in the course of the illustrations of the construction and action of the machine.

The leading principle of the machine in the production of a pattern is that of the pantograph, by which a given form is copied to a fixed scale, in this particular instance to one-sixth the size of the guiding pattern.

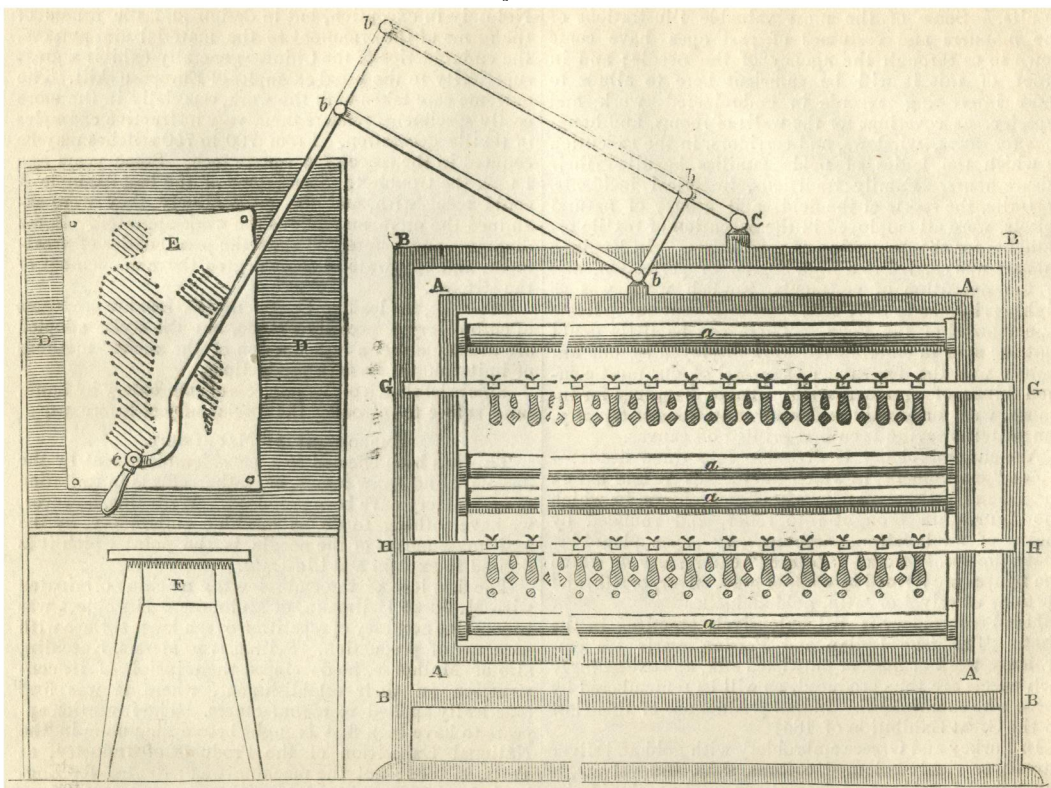
The machine may be divided into *three* parts:—

1. The pantograph and the embroidery frame, attached upon which the fabric to be embroidered is stretched.
2. The arrangement of the needles and the pincers by which they act on the fabric.
3. The locomotive arrangement of the carriages by which the embroidering threads are carried through the fabric.

The diagrams by which the constructive principle of these several parts will be illustrated are not drawn to any scale or relative proportion, but are simply intended to convey, as far as possible, a distinct idea of the leading features of the machine and its operations, and they have been drawn and arranged with that view only.

In Fig. 1 we have an elevation of the leading features of the machine, divested of all detail, giving only its essential parts. A, A, A, A, is the embroidery frame, within which the fabric to be embroidered is stretched in

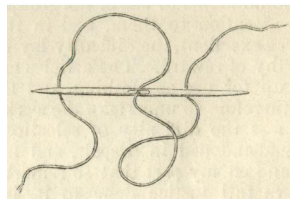
Fig. 1.



two divisions, an upper and lower one, upon rollers *a, a, a, a*. This swings from the outer frame *B, B, B, B*, at the pivot of the pantograph *C*. Every person who understands the action of an ordinary pantograph, will at once understand that if a figure of suitable design and size is fixed on the vertical plane *D, D*, as shown in the pattern *E*, all that will be required in order to copy this pattern to a fixed scale on the plane *A, A, A, A*, will be to move the pointer *c* of the lengthened side of the parallelogram *b, b, b, b*, by the handle attached to it. The angles of this parallelogram will become acute or obtuse, just according to the motion required to bring the frame *A, A, A, A*, into its proper relative position. To effect the copying of the pattern *E* by a series of stitches, a drawing generally six times the size of the pattern to be embroidered, is made upon a piece of stout paper, or a plate of tin. Each stitch is arranged to this scale, and a hole punched in the paper or plate at each end of every stitch. Into this hole the pointer of the pantograph is inserted before each stitch is taken. This point is moved backward and forward across the pattern, upon the system of stitches laid down by the embroiderer seated on the stool *F*; and with each motion the needles are drawn backward and forward through the fabric by a corresponding action of the carriages, on the frames of which the pincers which hold the needles are fixed, as indicated; *G* to *G* in the upper tier thus embroidering the upper piece of cloth, and *H* to *H* in the lower tier, by which the fabric fixed upon the lower pair of rollers is embroidered. The pattern *E* is thus repeated one sixth the size, each needle in operation executing a repeat, and the pattern when finished extends the whole width of the fabric at one operation.

The arrangement of the needles, and the mode by which they are alternately held and released must now be noticed. The needle-holders or pincers act in a manner analogous to the human hands, working from each

side of a framework of cloth, placed in a vertical position, the needle being a double-pointed one, with an eye for threading the silk in the middle, thus:—

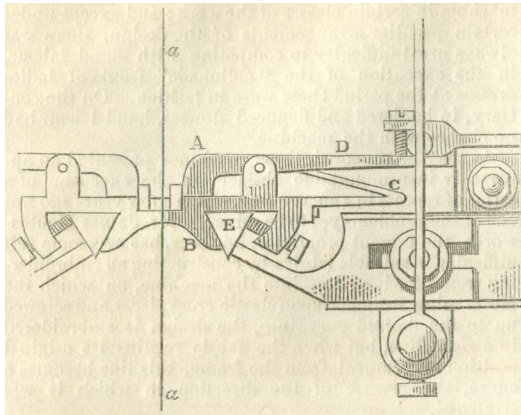


The pincers are arranged, as already stated, in a double row on two tiers across the framework of the carriages on each side of the embroidery frame, and project over, so as to come in contact with the fabric when stretched upon it. (See Fig. 3, *a, b, c, d*.) They are placed at one inch and a half from each other, and the larger machines have as many as 75 in each row. The construction of these pincers may be illustrated in profile by Fig. 2.

A is the upper jaw of the pincers, which is kept down upon the needle by the action of a spring.—*C*. By this spring the upper jaw is brought back into its place after the end has been pressed down at *D*, to release the needle after it has pierced the fabric, (as shown in section at *aa*.) and been received by the opposite pincer. *B* is the lower jaw, which is, of course, fixed to the frame. The prismatic rule *E* runs the whole length of each series of pincers, and sustains them in a perfectly true and corresponding position. The arrangement for the release of the needle after it has been driven through the fabric cannot be easily explained; it must, therefore, suffice to say, that the upper jaw of the pincer is pressed down at the proper time by the action of a rod on the lever end *D*, and the needle, thus released, after having passed

through the fabric, is held fast by the opposite pincer,

Fig. 2.

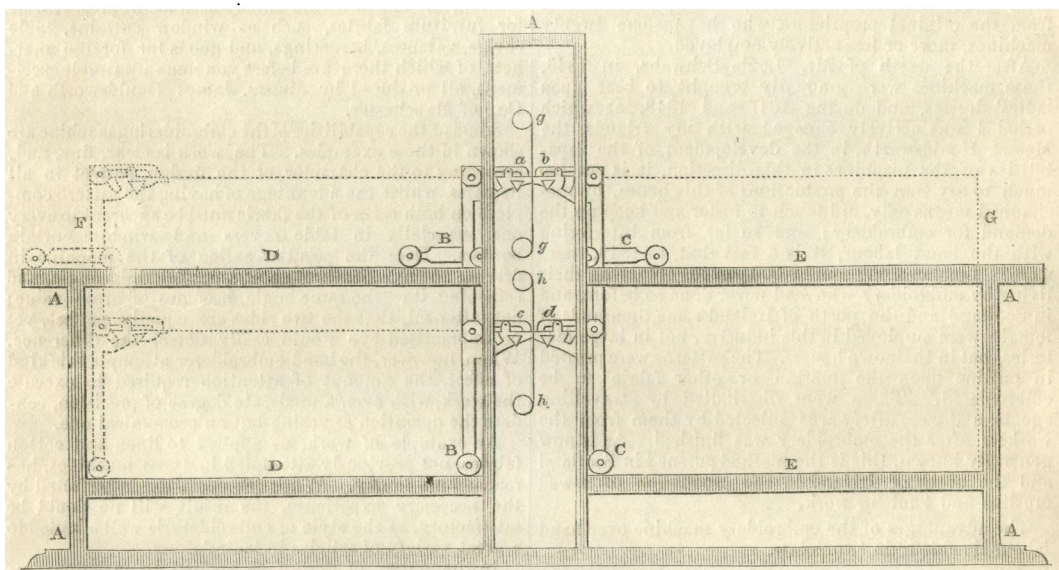


the thread being thus carried to its full tension, as shown in Fig. 3 at F, and then brought back again to the fabric to be taken up in the same manner by the pincer from which it had been released, again to return at each motion of the pantagraph handle indicating another stitch.

Originally this release of the needles depended upon the worker of the pantagraph, who had to use his or her feet upon treadles provided for the purpose, and attached to the releasing rod. One of the improvements effected by Mr. Henry Houldsworth was a mechanical arrangement by which these treadles were dispensed with, and the pantagraph worker, or embroiderer proper, released from the duty of attending to two movements. By this arrangement the releasing rod is acted upon by a clock motion, which is brought into play at the instant the carriage is driven against the frame work when the needle passes through the fabric.

The locomotive arrangement of that portion of the machine which carries the pincers and needles, may be understood in its elementary form by a reference to Fig. 3.

Fig. 3.



A, A, A, A, A, represents the structural framework of the machine, and is of iron; B B and C C the carriages acting on each side of the fabric; *a b* and *c d* indicate the position of the pincers carrying the needles. These carriages run on a species of railway along the horizontal lines D D and E E, and are required to be most accurately fitted. The section of the fabric stretched in a vertical position on the rollers *g g* and *h h*, and passing between the upper and lower tier of pincers, gives the centre line of the diagram.

We will now assume that the needles being threaded and fixed in the pincers *b* and *d*, are pushed through the fabric represented as stretched upon the rollers *g g*, *h h*. The needles are released from *b* and *d*, and seized by the pincers *a* and *c*. The carriage B B is then drawn backward to F, until the threads are all drawn equally through the fabric. The needles being threaded in pairs, that is to say, with a thread of double length, these threads are drawn up to their full tension at once. This supersedes the knotting of the thread to prevent its being drawn through the cloth. The embroiderer sitting at the pantagraph moves the point for the first stitch, as shown in Fig. 1 at E, the carriage B B is brought back to the fabric, and the needles forced through into the jaws of the pincers

b d, again they are released from *a c*, and being duly fastened upon by *b d*, the carriage C C is drawn along the frame until the thread is again at its full tension, when the carriage reaches G. Stitch the first is then complete.

The pantagraph pointer is again moved for another stitch on the enlarged pattern E, Fig. 1, and again the process of bringing up the needles to the fabric—their passing through—their release on one side and their seizure on the other is repeated, and so the work goes on until fresh needles and thread are required, when the same course is repeated in the putting in, and starting the work at the same point at which the last stitch of the former thread left the work incomplete.

Each machine is usually worked by three young women and three or four girls, the latter being employed to thread the needles and prepare them for the machine, that a supply may be always on hand. One young woman—who is generally the most experienced, and acts as the “captain” of the machine—attends to the pantagraph, criticises the work, and directs the motions of the workers of the carriages, who push backward and forward the rows of needles. With an intelligent “captain,” quick and skillful workers, and rapid threaders, an elaborate pattern,

and a machine in good working order, I know nothing in manufactures more interesting than the embroidering machine. The pattern grows so rapidly under its action; every stitch tells toward the final effect; and the result is at once so satisfactory, that the operation appears to be the realisation of the thought of the workers direct from their minds, and with no more mechanism than is necessary to realise that thought.

The original machine, as devised by M. Heilmann, was worked by one person, but had this feature been retained the economic value of the invention would have been lessened. It was only by extending the size and capabilities, improving the structure of the parts, without in any way interfering with the principle, which has always been the same, that it could be brought into successful operation as a paying manufacturing agent. In Switzerland the original form is still retained for cotton embroidery, and found to answer for that class of work.

From the time of its first introduction into England, until within the last two or three years, the embroidering machine was employed only by Messrs. James Houldsworth, and Co., of Manchester, as the successors of Mr. Louis Schwabe. A few machines are now used by one or two other persons at Manchester, but the great mass of productions in machine embroidery still emanate from the original proprietors, who have some twenty machines, more or less actively employed.

After the death of Mr. Louis Schwabe, in 1845, these machines were gradually brought to bear upon ladies' dresses, and during 1847 and 1848, at which period I was actively engaged with my friends, the Messrs. Houldsworth, in the development of the capabilities of the machines in this direction, it is not too much to say that the productions of this house, by mechanical means only, did much to foster and keep up the demand for embroidery; and so far from interfering with the hand labour, it is a fact that, in 1849, there were in London alone some 2,000 persons obtaining their living by embroidery who had never done so before, and in Scotland and the north of Ireland some thousands of females were employed in this industry, not in large factories, but in their own houses. The patterns were printed in outline upon the merino or other fabric to be embroidered. These were distributed by travelling agents, and were afterwards collected by them from the workers after the embroidery was finished. As is now generally known, this is the method pursued in Scotland and the north of Ireland in the production of sewed muslins and tambour work.

The advantages of the embroidery machine over hand labour lie chiefly in two points.

1. The rapidity, accuracy, and excellence of work in the production of repetitions of the design in borders, sprigs, flounces, and trimmings for dresses.
2. The perfect embroidery of a pattern on each side of the fabric, as in the case of window curtains, table covers, and trimmings for upholstery purposes.

In the first of these it will be seen that, inasmuch as a needle can be worked at every inch and a half of a machine, and in a double row, there must be great economy in the execution of a pattern arranged so as to repeat at every inch and a half within the vertical range of the embroidering frame, that is to say, within the action of the pantagraph in its command over the rows of needles. The machine is therefore always worked at the greatest advantage when the full range of needles is brought into operation by small repeats, and at the greatest disadvantage when large repeats are worked, and thus a certain number of needles, or rather needle-holders or pincers are idle. Thus, in a pattern which is only repeated at every six inches, three pincers would be idle in every such space in the machine, and my own impression is, that with less than a dozen needles at work, the machine operates at a loss, or at least that there is no gain in the work, except in the matter of a double-sided pattern.

The usual calculation is that with less than eight needles the work is executed at a loss.

This is of course one of the disadvantages of the machine in certain classes of the work; and except under certain peculiar arrangements of the design, there was always great difficulty in competing with hand labour, in the execution of the "collonade" fronts of ladies dresses at the period these were in fashion. On the contrary, in bordered and flounced dresses, hand-labour had no chance with the machine.

As may be supposed, these machines presented an apparently insurmountable obstacle in the execution of a series of repeats in a curved line, which a few years ago was one of the problems yet to be solved. Mr. James Houldsworth, the present proprietor, however, has overcome this difficulty in suitable fabrics, by constructing an embroidering frame for insertion into the machine, on which the fabric being stretched upon elastic cross pieces, and screwed up to the desired curvature, the design is embroidered in a right line, but when the fabric regains its original position on removal from the frame, this line becomes a curve, the reverse of the direction in which it was stretched.

Embroidery for dresses being comparatively out of fashion, the machines are chiefly used at the present time for furniture fabrics, such as window curtains, table covers, valences, borderings, and goods for foreign markets, of which there are before you some admirable specimens, all produced by Messrs. James Houldsworth and Co., of Manchester.

Some of the capabilities of the embroidering machine are shown in these examples. The work is clear, fine, and, according to the character of the design, perfect in all its parts, whilst the advantage of having the pattern complete on both sides of the fabric must be apparent to every one, especially in table covers and window curtain borders. Here the peculiar action of the machine in driving the needles through at a perfect right angle, and returning it at the same angle, becomes of great value; not, after all, that the two sides are equally perfect, yet no unpractised eye would easily detect the difference. When, however, the hand embroiderer attempts this kind of effect, the amount of attention required to execute the work, with even a moderate degree of precision, renders the operation anything but an economical one.

An example of work, as applied to linen and cotton fabrics, not previously attempted in these machines, has reached me to-day. When the operation is perfected by the necessary experience, the result will no doubt be satisfactory, as the style of embroidery is well adapted to a great variety of articles in ladies' dress.

In the matter of design as applied to machine embroidery it must be evident that there are certain peculiarities about it which the artist, to be successful, must thoroughly understand.

The repeats of the pattern must all be either one inch and a half wide, or multiples of that width; that is to say, three, four and a half, or six inches, and so on. The vertical range may be said to be unlimited, except by economy of production; for, by means of the rollers on which the fabric is placed, the work can be carried even into stripes, as, indeed, has been done when necessary. In making a working design, the length of stitch has to be carefully kept in view, and the angle at which the thread will lie when the work is seen as a whole. In hand-embroidery this is also a condition, but in that great masses of these stitches may be brought together, which is a peculiarity of Eastern embroidery, and the effect produced by the contrasting angles at which the thread is inserted is often very remarkable, especially when different shades of the same tint or colour have been employed. In machine embroidery this kind of effect cannot be imitated successfully or economically, and it is usual to keep each form as much as possible to one, or, at most, two series of stitches. Shaded effects, however, are produced, as in the case of the dress embroidered for Her Majesty the

Queen, by dyeing the silk with a graduated tint or shade, by which the thread is dark at one end and gradually becomes light at the other end. Pleasing effects are thus produced in a very economical manner, even in what are called self-coloured embroideries—say, on dark green merino, embroidered with silk shaded from dark to light green. These irregular effects of light and shadow are not, however, very legitimate when viewed artistically; but for this the manufacturer cares quite as little as the consumer. If the things sells with the one and “looks pretty” to the other, that is enough, according to the art-creed of both.

There is yet another point which in the smaller patterns it is of considerable importance for the designer to bear in mind. Silk at 40s. per lb. is too costly to be wasted, therefore it is desirable that each needleful should do its work, and that no fragments should remain to cut away at a loss. Hence patterns have to be designed to the needleful; and, if a pattern, however excellent in the abstract it may be, consumed one needleful and 36 inches out of two needlefuls of 42 inches each, it would be considered anything but sound economy in machine embroidery to execute it, as eight inches of silk would be lost in each needle employed—a waste upon any extent of production which would astonish those who are not in the habit of thinking about mere fragments in the materials of manufacture. It will at once be seen from this fact that the designs for machine embroidery must ever be somewhat peculiar, and, to a certain extent, limited in range of form, and that all the more successful—certainly the most economical—are made almost in the presence of the machine by which they are to be executed, and, for the most part, under no higher inspiration than that of a species of artistic measure table, such as:—

Two needlefuls make one flower.

Three flowers make one repeat.

Twenty repeats make one border.

Four borders make one table cover decoration.

One can thus tell almost to an inch—certainly to a yard—how much silk will be consumed in a given operation.

It will now be asked, “Do these machines begin and finish their work completely?” Not absolutely; but so perfect is the work in a well-arranged pattern that, with the exception of the cutting out of certain ends used for starting points, the occasional fastening of other ends, and the insertion here and there of a stitch by hand, the work is practically finished when it leaves the machine. Experienced hand embroiderers, acquainted with the peculiarities of machine work, are, however, employed to look it over.

As a branch of factory labour for females, none is so healthy, certainly none more interesting.

The workers are generally the most intelligent of their class, and their wages are fully remunerative when work is abundant; but there is one great drawback in the economical working of these machines, in contradistinction to that of most other manufacturing agents. The fashion for embroidery fluctuates very much. In times of increased demand there is great anxiety and much trouble in instructing even the generally intelligent girls who are desirous to get this kind of employment.

A sudden change of fashion throws the machines out of work, and with it the workers, and when a demand again occurs, fresh hands have to be instructed. Happily, there is less change in furniture fabrics than in dresses, and thus the best hands are retained ready for an emergency and the instruction of others; but the operative classes are now keenly alive to the disagreeable character of fluctuating employments, alike to employer and employed; and thus the difficulty is increased even to such a house as that of the proprietors of these machines, whose reputation as employers of factory hands has always stood so high.

In concluding this attempt to explain the mechanical

principle and economic application of one of the most interesting agents which, in the progress of modern invention, has been brought to bear upon textile decoration, it is only right to state that the imperfections of the exposition are inherent in the subject, and nothing but a very earnest desire to comply with the wishes of the managing officers of the Society of Arts, that a popular explanation of the construction and peculiarities of the embroidering machine should be given to the members, would have induced me to undertake the task, under the many disadvantages which must necessarily arise out of the fact that my connection with these machines, in a practical form, ceased ten years ago, and I doubt if I have seen them more than three times in the interval.

DISCUSSION.

Mr. FREDERICK LAWRENCE inquired whether different coloured silks or threads were worked in the machine at the same time.

Mr. WALLIS replied that in producing chintz effects, as many colours as might be necessary could be used in different needles, but in getting the shaded effects, as shown in some of the examples, the “trick,” for such it really was, of shading the silk in dyeing from light to dark had to be adopted; and thus a certain variety of effect was produced, although this was not always of a very artistic character.

Mr. WILLIAM HAWES said, looking at this paper, not with the eye of a manufacturer, because he had no knowledge to enable him to form an opinion upon the subject, but as being very interesting in a social point of view, he would offer a few remarks upon one or two matters connected with the subject. The first point which struck him, was that this invention afforded employment to women. It was that peculiar kind of occupation which, whilst stimulating taste, was capable of becoming a domestic manufacture, and was, therefore, of the greatest benefit to that class which stood most in need of employment. This machine appeared to effect the important end of the economical working of a costly material; for they understood from Mr. Wallis that they could measure, almost to the fractional part of an ounce, the quantity of silk necessary to produce a certain amount of embroidery; and, when that fact was known, all temptation to fraud on the part of the workpeople ceased; whereas, in times past, when the silk machines were employed in the houses of the workers, they became a source of constant collision between the employers and the employed, in accounting for the material entrusted to them for the purposes of manufacture. If this machine was capable of doing certain descriptions of embroidery, as well as, or better than, hand labour, and employed persons for whom employment was required, and at the same time allowed the manufacturer to entrust a valuable commodity in the hands of the work-people, without fear of fraud—on all those grounds it must be regarded as a valuable addition to our mechanical resources. They had been told that the machine was not, in all cases, capable of producing such perfect results as were obtained by hand labour; but they were likewise told that for some descriptions of goods it produced a better and cheaper article than hand labour could supply. These were points which he thought were especially deserving the attention of the Society; and he considered that they were very much indebted to Mr. Wallis for the clear manner in which he had put before them the benefits which manufacturers and the public might derive from machines of this kind.

Mr. DAVID CHADWICK said, although not connected with this branch of manufacture, he wished to call the attention of Mr. Wallis to an omission in his paper. He did not hear that any mention was made of a gentleman in Lancashire who had devoted a great deal of attention to embroidery—Mr. Gilbert French, of Bolton. He had visited the works of that gentleman, and had

noticed the large number of females who were employed upon this beautiful work, and he had seen specimens of embroidery which, to his eye, were more beautiful and elaborate than those exhibited that evening. Although, as a Manchester man, he felt proud of the honourable mention that had been made of Mr. Houldsworth, yet he thought it would have been well if Mr. Wallis had brought forward some specimens of hand labour in this branch of art, produced by first-class workers of the present day, so as to compare them with the best productions of machine embroidery. As one of the public he thought Mr. Wallis's paper was somewhat defective in some portion of its statistics. He had given them minute particulars of the process by which the work was effected, but he had not given any comparison of the cost of producing these beautiful articles by machinery as compared with that of hand labour. To the public generally it was a matter of little importance by what means a particular article was produced; they were only interested in the economy of the production. Those who purchased these fabrics were astonished at the price at which beautiful table covers could now be obtained, as compared with the cost of similar articles ten or fifteen years ago. He should be glad to hear from Mr. Wallis, if he was able to furnish it, a comparative statement of the cost of producing these articles by hand labour and by machinery. During his (Mr. Chadwick's) visit to Mr. French's establishment, he was informed that that gentleman supplied hand-worked patterns of embroidery of the most costly description, not only to every part of England, but almost to every part of Europe, and that he found, notwithstanding the increasing production of machinery, the demand for hand embroidery work had been constantly advancing.

Mr. WALLIS said he feared that Mr. Hawes had misunderstood his remarks as to the increase of domestic employment occasioned by the stimulated production of embroidery in 1847-8. The machines could never be brought into use in the houses of the workers like the sewing machines, as they were of too cumbersome and costly a character. All that was meant in this direction was to call attention to the fact that the demand for hand labour was increased by the action of the machines in cheapening production and thus stimulating demand.

Mr. HAWES said he had merely quoted from the paper itself, which stated, "so far from interfering with the hand labour, it is a fact that, in 1849, there were in London alone some 2,000 persons obtaining their living from embroidery who had never done so before, and in Scotland and the north of Ireland some thousands of females were employed in this industry, not in large factories, but in their own houses."

Mr. WALLIS continued—With respect to Mr. D. Chadwick's remarks, it happened that Mr. Chadwick was a statistician, and he (Mr. Wallis) an artist; both studied figures, but they were of a different kind. He had great respect for figures in arithmetic, and no doubt it would have added to any value there might be in his paper if some comparative statement could have been made as to the cost of production in certain classes of work by machine and hand embroidery. It happened, however, that one or two articles would be no test whatever for any other article, as each would have to be judged of by the quantity of work in each under the precise conditions of its production, for, as shown in the paper, economy in machine embroidery depended upon the greatest use of the needles, and adaptation of the pattern to length of thread, etc. With respect to the excellent productions of Mr. Gilbert French, of Bolton, he (Mr. Wallis) thought he had carefully guarded himself from misapprehension when he stated that his subject was commercial and not artistic embroidery; besides, he had illustrated by a reference to certain examples, the fact that the machine could not produce large and massive patterns of an exceptional character with the same economy as small repeats; nor did he believe that on the whole the larger works would pos-

sess the artistic qualities of good hand embroidery. His object had not been comparison, but a simple statement of what the embroidery machines could do.

Mr. G. F. WILSON, F.R.S., said there was one point of great interest mentioned in the paper, which had a particular bearing upon the matter which they were all so anxiously discussing—namely, the great Exhibition of 1861. It had been shown that this machine had been first brought out at the national exposition of products at Paris, which was another fact added to the many that had already appeared in the *Journal* of the Society in connection with exhibitions.

The CHAIRMAN remarked that it would be clear to all present that when Mr. Wallis undertook to read this paper he entered upon a difficulty. When he (the Chairman) first heard the announcement of this paper, he could not conceive how Mr. Wallis could make them comprehend the subject without a machine to illustrate it. But they must all admit that he had explained it well, and that they now really understood how embroidery by machine was accomplished. With regard to the statistics of economy by this process, which had been asked for by Mr. Chadwick, they would understand that in a certain class of goods the economy was twenty times as great as in others. Some of these machines would carry 100 of these needles in one length, and work two frames at the same time—working 200 needles in a simultaneous operation. It appeared that a machine of this description required the attendance of one person to work the pantograph point, four girls to move the frame, and three others to thread the needles. Thus, they had 200 needles at work with the labour of eight persons, which made a proportion of 25 needles to 1. In some cases there would be no economy at all in the use of the machines; but it was in such articles as table covers, and embroidered cloths that the economy of the machines was most apparent. In the embroidery of one of the table covers exhibited, they would probably have two rows of 96 needles each at work, and from the length of the frame they could work two covers at once; and at the same time the manufacturer had the satisfaction of knowing that he could not be robbed of his silk, as they could calculate almost to a drachm what quantity of silk was consumed in working a particular pattern. Mr. Wallis did not go quite far enough back in his history of the use of these machines. He (the Chairman) remembered that about the year 1834, Mr. Schwabe undertook a very large contract from a city house for embroidered merino dresses; he believed that was the occasion of the first introduction of machine embroidery for ladies' dresses. He might observe that since sewing machines were introduced they had heard very little about distressed needlewomen, and it was evident that the introduction of the embroidery machine had greatly increased the demand for that branch of labour. Machine labour and hand labour acted and re-acted upon each other, the one creating a demand for the other. He had now to propose that which he was sure would be passed with acclamation, namely, a vote of thanks to Mr. Wallis for his interesting paper.

The vote of thanks having been passed,

Mr. WALLIS briefly acknowledged the compliment.

The Paper was illustrated by a large number of fine specimens of machine embroidery, lent by Messrs. Houldsworth and Co., of Manchester, as well as by several working diagrams prepared by Mr. Wallis. Messrs. Wilson and Newton exhibited their Boudoir Sewing Machine.

The Secretary called attention to an instrument, invented by the Rev. W. Taylor, for enabling the blind to work sums in arithmetic, and solve algebraical problems. A description of the instrument will be found at page 328 of the *Journal*.

The Secretary announced that on Wednesday evening next, the 13th inst., a Paper by Mr. H. Hyde, "On Professor Hughes's System of Type-printing Telegraphs and Methods of Insulation, with Special Reference to Submarine Cables," would be read.

SCHOOLS IN SAXE COBURG.

Persons connected with education in this country will probably peruse with some degree of interest the plans of teaching adopted at two Institutions of different character in the Duchy of Saxe Coburg—the Gymnasium Casimirianum, a learned school, at which the study of the ancient languages holds a prominent place, and the "Real-Schule," or School of Practical Utility, where more attention is paid to natural science, the study of Greek being omitted altogether. An outline of the plan pursued at a third Institution, the Ducal Gymnasium, is likewise before us, but, in principle, it so closely resembles that of the "Real-Schule," that particular description would be superfluous.

Those who are not familiar with the scholastic language of Germany should be informed that the lower numbers designate the higher classes, so that the "prima," or first, is the highest, except where, as in the case of the Gymnasium Casimirianum, there is a "selecta," or select class, even above the "prima." The hours set against each department of study are obviously per week. The names at the head of each class are those of the professors or teachers in ordinary, but these do not give instruction in all the departments of study pursued by their several classes; nor is each confined exclusively to his own.

Plan of Instruction adopted at the Gymnasium Casimirianum for the Scholastic year beginning at Easter, 1853, and ending at Easter, 1854:

SELECTA.—(SIX PUPILS.)—DIRECTOR FORBERG.

Religion.—Two hours, in conjunction with the Prima.—In summer, an exposition of the Life of Christ, according to the Four Gospels. This is combined with an explanation of several passages of scripture (especially from the fourth gospel), bearing reference to the *person* of Christ. In the winter, an explanation of the Acts of the Apostles and the Epistle to the Romans.

Latin.—Seven hours.—A selection from the Odes and Episodes of Horace; a selection from Cicero's Epistles: the Annals of Tacitus, books iv., v., vi., xi.; free Latin compositions, one every month; written and oral translation, after Nägelsbach's Exercises in Latin style.

Greek.—Ten hours.—Plato's "Menexenus, Apology of Socrates and Phædo, in connection with written exercises after Rost and Wüstemann's "Introduction to Translation; the "Ajax" and "Œdipus of Sophocles.

Hebrew.—Two hours.—Grammar, after Gesenius (the declension of nouns); the first eight chapters of the Book of Judges; exercises in reading the text without points.

German.—Four hours.—Essays and discussions; explanation of some of Goethe's Lyrical Poems; Goethe's "Iphigenie" and Schiller's "Don Carlos."

French.—Two hours.—"Le Malade Imaginaire" and "Les Femmes Savantes" of Molière. Oral translation from Lessing's "Minna von Barnhelm," and "Emilia Galotti." Written translation from Grube's "Reisebilder," and the second part of Hermann Müller's Grammar.

English.—Two hours.—Selections from Washington Irving's "Sketch-book;" Byron's "Mazeppa" and "Siege of Corinth;" repetition of Syntax after Wahlert, with weekly exercises in composition.

History.—Two hours.—The Middle Ages, from the commencement to the Reformation.

Mathematics.—Three hours.—Combination, elements of the calculation of Probabilities; Binomial Theorem;

Quadratic Equations, with several unknown quantities; solid Geometry; exercises.

Physical Science.—Two hours.—Geo. Statics and Geo Dynamics. Mathematical Geography.

Drawing.—Two hours.—In conjunction with the Prima.

Singing.—One hour.—In conjunction with the Prima.

PRIMA.—(TWELVE PUPILS.)—PROFESSOR TROMPHELLER.

Religion.—Two hours.—In conjunction with the Selecta.

Latin.—Seven hours.—The "Catilina" and "Jugurtha" of Sallust; the "Andria" and "Adelphi" of Terence; Cicero's Oration against Cæcilius (Divination), and Verres (book iv.). Latin Exercises from Supfle; (Aufgaben).

Greek.—Five hours.—Homer's "Iliad," lib. xxi. to xxiv. Select Idylls from Theocritus, Bion and Moschus; Herodotus, Lib. viii., 1—183; Greek Syntax after Krüger, with exercises after Rost and Wüstemann's "Introduction."

Hebrew.—Two hours.—Grammar after Gesenius; the Verb; Extracts from Maurer's "Elementarbuch;" the Prophet Jonas; First Book of Kings, chap. 1.

German.—Three hours.—Examination of weekly and monthly exercises. Explanation of a selection of poems from Echtermeyer and Hiecke's Anthology (Blumenlese), and of the "Götz von Berlichingen," of Goethe.

French.—Two hours.—Séguir's "Histoire de Napoléon et de la Grande Armée." Oral translation from Schiller's "Neffe als Onkel" and "Parasit." Written exercises after Müller's Grammar.

English.—Two hours.—Washington Irving's "Life of Columbus," Conjugations, Syntax, and Exercises after Wahlert.

History.—Two hours.—Ancient History.

Mathematics.—Three hours.—Systems of Notation, Evolution, Quadratic Equations, with one unknown quantity, Involution, Logarithms, Progressions, with application to interest and annuities; Plane Geometry concluded; Solid Geometry commenced.

Physical Science.—Two hours.—Mechanical and Chemical Phenomena.

Drawing.—Two hours.—In conjunction with the Selecta.

Singing.—One hour.—In conjunction with the Selecta.

SECUNDA.—(THIRTEEN PUPILS.)—PROF. DR. KERN.

Religion.—Two hours.—Explanation of select passages of Scripture. Repetition of the Lutheran Catechism.

Latin.—Two hours.—Ovid's Metamorphoses, Lib. ii. iii. iv. (with omissions). Cæsar, Bellum Civile, Lib. ii. iii. Grammar after Zumpt, and Exercises after Supfle.

Greek.—Six hours.—Homer's Iliad, Lib. vii. viii. ix. Lucian's "Dialogi Deorum," "Dialogi Marini," and "Cataplus." Declensions and Conjugations after Krüger, with weekly exercises after Rost and Wüstemann.

German.—Three hours.—Reading and explanation of specimens from Mager's "German Reader" (*Deutsches Lesebuch*). Exercises in oral delivery and essays.

French.—Two hours.—Reading from Gruner's "Chrestomathie." Weekly exercises and explanation of the first part of Herman Müller's Grammar.

History.—Two hours.—The Ancients and the Middle Ages.

Geography.—Two hours.—Australia and Europe, omitting the Balkan Island.

Mathematics.—Three hours.—Elements of integral and fractional Arithmetic and Algebra, Simple Equations, Proportion, and Rectilinear Geometry, complete. Exercises.

Natural History.—One hour.—In Summer: Botany—the plants being classified according to Linnæus. In Winter—the second part of the introductory course in Physics.

Drawing.—Two hours.—After Copies and Nature.

Calligraphy.—Two hours.

Singing.—One hour.

TERTIA.—TEACHER IN ORDINARY, MATHER. (NINE PUPILS.)

Religion.—Two hours.—Exposition of the Lutheran Catechism.

Latin.—Seven hours.—Reading of Döring's Elements, and select Biographies of Cornelius Nepos; Grammar and Exercises.

Greek.—Five hours.—Declensions and Conjugations as far as the contracted Verbs. Translations from Jacob's Elements and Weekly Exercises.

German.—Three hours.—Explanations of specimens of prose and verse from Gude's "Reader." Essays and practice in Declamation and Narration.

French.—Two hours.—Reading of Gruner's "Chrestomathie." H. Müller's Grammar, Exercises.

History.—Two hours.—Repetition of the course of the previous year, German history from the time of the Hohenstauffen.

Geography.—Two hours.—Repetition of the course of the previous year, also Africa, Asia, Australia, and a part of Europe.

Natural History.—Two hours.—In Summer, description and definition of plants, with the characteristics of the more important families. In Winter, Zoology (Mammalia, with especial reference to man).

Mathematics.—Three hours.—Commercial Arithmetic, decimal fractions, extraction of the square root, simple equations, lines and angles.

Drawing.—Two hours.

Caligraphy.—Two hours— } in conjunction with Quarta.
Singing.—One hour— }

QUARTA, TEACHER IN ORDINARY, DRESSEL. (TWENTY-FOUR PUPILS.)

(The pupils in this class, united in other respects, are divided into two sections, according to their proficiency in Latin, and French is learned in the upper section only).

A.—THE ENTIRE CLASS.

Religion.—Three hours.—Completion and repetition of Old Testament History; followed by New Testament History.

German.—Three hours.—Gude and Gittermann's "Reader;" explanation of poems, essays, practice in narration and declamation.

History.—Two hours.—Repetition of ancient history. Epoch—marking events in German history, till the time of Frederick the Great.

Geography.—Two hours.—General introduction; the world, with the exclusion of Europe.

Natural History.—Two hours.—General view of the vertebrated animals; the mammalia by way of repetition; birds.

Drawing.—Two hours.

Caligraphy.—Two hours— } in conjunction with Tertia.
Singing.—One hour— }

B.—UPPER SECTION OF QUARTA.

Latin.—Grammar after Kühner's Elements; translation after Döring's Elements; exercises.

French.—Two hours.—Reading of Voigtmann's French Elements; H. Müller's Grammar, with oral and written translations of the exercises which it contains.

C.—LOWER SECTION OF QUARTA.

Latin.—Five hours.—Declension and conjugation; translation from Bagge's Introduction (Vorschule); exercises.

Plan of Instruction adopted by the "Real-Schule" for the Scholastic Year, 1857-8.

CLASS I.—(NINE PUPILS.)

TEACHER, THE DIRECTOR, DR. ERNST FRIEDERICH EBERHARD.

Religion.—Two hours.—Introduction to the Old and

New Testaments: Epistle to the Romans; History of the Christian Church.

German.—Three hours.—Reading and exposition of Göthe's "Egmont," and of the "Antigone" of Sophocles (in German). History of Literature—Improvement of Style with regard to Domestic Affairs—Extemporaneous Speaking and Discussion.

English.—Three hours.—Byron's "Mazeppa;" Macaulay's "History of England;" exercises in writing and speaking.

French.—Three hours.—The "Lucrèce" of Ponsard; Poems of Béranger; writing and speaking.

Latin.—Three hours.—"Livy;" exercises in composition.

Mathematics.—Six hours.—Modern Geometry; higher branches of Trigonometry; solid Geometry and Projection—continued Fractions; Diophantine analysis; Series, with their application—Binomial Theorem, Calculation of Probabilities; Cubic Equations.

Physical Science.—Five hours.—The Doctrine of Imponderable Substances; Structure of the World.

Chemistry.—Three hours.—Repetition of Organic Chemistry; Elements of Organic Chemistry; Qualitative Analysis; exercises in Manipulation.

Geography.—Two hours.—Special study of Europe.

History.—Two hours.—Modern times, from the Reformation to 1740.

Drawing.—Two to four hours.

Singing.—Two hours.

Gymnastics.

CLASS II.—(THIRTEEN PUPILS.)

TEACHER, SCHLEGEL.

Religion.—Two hours.—Reading of the Psalms, and some of the Prophets, and one of St. Paul's Epistles; Church History.

German.—Three hours.—Reading of Schiller's "Braut von Messina;" Review of the different kinds of poetry, particularly the Epic; and illustrative reading.

English.—Three hours.—Washington Irving's "Sketch Book," alternately with Gantter's "Chrestomathie"; Exercises in writing and spelling.

French.—Three hours.—The "Avare" of Molière; Ségur's "History of 1812;" exercises in spelling and writing.

Latin.—Three hours.—Cæsar "De Bell. Gall.;" composition.

Mathematics.—Six hours.—First course of Geometry; Geometrical Problems; Plane Trigonometry; general Arithmetic; Simple Equations, with one or more Unknown Quantities; Powers, Roots, Logarithms; Compound Interest.

Physical Science.—Three hours.—Doctrine of Imponderable Substances.

Chemistry.—Three hours.—Metalloids and Light Metals.

Natural History.—Two hours.—Botany; Systematic Classification of Plants; Morphology. In winter, Zoology.

Geography.—Two hours.—Special Study of Europe.

History.—Two hours.—The Middle Ages:—Drawing, Singing, Gymnastics, as above.

CLASS III., UPPER DIVISION.—(TWENTY-EIGHT PUPILS.)

TEACHER, A. MUELLER.

Religion.—Two hours.—The Gospel of St. John, and the Acts of the Apostles; the fourth and fifth sections of the Catechism.

German.—Four hours.—Explanation of selections from Nacke and Lüben's "Reader;" exercises in speaking and writing.

English.—Three hours.—Reading of Gantter's "Chrestomathie"; oral and written exercises after Voigtmann's Elements.

French.—Three hours.—Gruner and Wildermuth's "Chrestomathie;" exercises in speaking and writing.

Latin.—Three hours.

Mathematics.—Six hours.—Second course of Plane Geometry. Arithmetic—repetition of preceding course; Extraction of Roots; Single Equations, with one unknown quantity.

Natural Science.—Two hours.—Elements.

Natural History.—Two hours.—Botany: Classification and description of Native Flora; characteristics of the more important families of plants.

Geography.—Two hours.—Europe, especially Germany.

History.—Two hours.—The Ancients.

Caligraphy.—Two hours.

Drawing, Singing, and Gymnastics, as above.

CLASS III. LOWER DIVISION. (FIFTY-THREE PUPILS.)
TEACHER, SCHINDHELM.

Religion.—Two hours.—Scriptural reading; the third section of the Catechism.

German.—Four hours.—Mager's Reader; exercises in writing.

English.—Three hours.—Gräser's "Clue" (Leitfaden).

French.—Four hours.—Exercises in speaking and writing, accompanied by Plötz's course.

Latin.—Three hours.

Arithmetic.—Four hours.—Commercial Arithmetic.

Geometry.—Three hours.—First course.

Natural History.—Morphology; Description and Classification of the Native Flora. In the Winter, Zoology.

Geography.—Two hours.—The quarters of the Globe, especially Europe.

History.—Two hours.—Germany.

Writing.—Two hours.

Drawing, Singing, and Gymnastics, as above.

CLASS IV.—(FORTY-SEVEN PUPILS.)

TEACHER, ZIZMANN.

Religion.—Three hours.—Second Section of Catechism. Reading of New Testament.

German.—Four hours.—Mager's "Reader." Exercises in Writing.

Latin.—Four hours.

French.—Four hours.—Plötz's "Compendium" (Lehrbuch).

Arithmetic.—Four hours.—Fractions; Introduction to Mercantile Arithmetic; Rule of Three.

Natural History.—Two hours.—Description of several native plants and animals.

Geography.—Two hours.—Germany.

History.—Two hours.—The times after Charlemagne.

Singing.—Two hours.

Writing.—Three hours.

Drawing (after nature and geometrical).—Two hours. *Gymnastics*.

CLASS V.—(FIFTY PUPILS.)

TEACHER, HUEFER.

Religion.—Three hours.—The Decalogue.

German.—Four hours.—Exercises in writing and speaking.

French.—Five hours.—After Plötz's "Compendium."

Arithmetic.—Five hours.—Fractions.

Natural History.—Two hours.

Geography.—Two hours.—General introduction and use of the globes.

History.—Two hours.—The Ancients.

Writing, Drawing, Singing, as in Class IV.

CLASS VI.—(THIRTY-EIGHT PUPILS.)

TEACHER, A. KRAUSS.

Religion.—Three hours.—Biblical narrations from the Old and New Testaments; Texts; Hymns; the Decalogue, without Luther's explanation.

German.—Two hours.—Explanation of short passages of Scripture. Exercises in Writing and Orthography.

Arithmetic.—Six hours.—The Four Rules, with Concrete Numbers.

History.—Two hours.—The most important events of different Times and Nations, taught biographically.

Geography.—Two hours.—The principal Mountains, Rivers, and Cities of Germany.

Natural History.—Two hours.—Description of the commonest Domestic Animals.

Writing.—Four hours.

Singing.—Two hours.

Drawing.—Two hours.

Gymnastics.

CLASS VII.—(THIRTY-NINE PUPILS.)

TEACHER, HAUCH.

Scripture History.—Five hours.—Narratives from the Old and New Testaments; easy Texts and Hymn-verses committed to memory.

German.—Six hours.—Reduction of Sentences to Words; of Words to Syllables; and of Syllables to Simple Sounds; the Parts of Speech; Exercises in the narration of short, simple Tales; Orthographical Exercises.

Reading.—Four hours.—Tales and Poems from Ludwig and Heinisch's "Reader," suited to the capacity of children, read and explained; Simple Poems committed to memory.

Arithmetic.—Six hours.—The four rules, with abstract numbers.

Natural history.—Two hours.—In the Summer several native plants described and compared; in the Winter several beasts, birds, amphibious animals, fishes and insects.

Geography.—Two hours.—First Notions, as, for instance, the elevation and depression of the earth. The Saxon duchies passed in review.

Writing.—Three hours.

CLASS VIII.—(TWENTY-SEVEN PUPILS.)

TEACHER, J. K. PECHTOLD.

Religion.—Two hours.—Suitable narratives from the Old Testament, with appropriate texts and verses.

German.—Six hours.—Reading exercises in German and Roman letter, orthography, short essays, and composition.

Arithmetic.—Four hours.—Numeration from 10 to 100.

Geography, by actual inspection.—Two hours.—The City of Coburg and its nearest environs; observation of the most ordinary natural phenomena.

Natural history by actual inspection.—Two hours.—Description of bodies ordinarily met with by children.

Writing.—Two hours.

CLASS IX.—(TWENTY PUPILS.)

Religion.—Two hours.—Tales to awaken religious and moral feelings.

German.—Four hours.—Reading, writing, and speaking.

Arithmetic.—Numeration of the first ten numbers.

Instruction by actual inspection.—The School and the Home.

HALF-TIME SYSTEM OF EDUCATION.

The following is an abstract of a Paper read by C. Paget, Esq., M.P., at the Liverpool Meeting of the Association of Social Science:—

Having seen the advantage of the Half-time System of Factory Education, it occurred to me that the same principle might be introduced into rural districts.

In November, 1854, I employed eight boys on my farm, to do the work formerly performed by four, each boy spending half his day at work, and half at school—relieving each other, so that I should always have four on the farm and four at school. I found an inconve-

nience in this arrangement; when the boys' clothes were wet and dirty, from their morning's work, they were unfit for school. The boys, therefore, now work on alternate days.

After four years' experience, as an employer of labour, I have every reason to be satisfied with this system.

The boys, having an alternate day of rest, work with more pleasure and spirit; and I find as many willing to accept employment as I want. The parent, who might feel the entire loss of his son's wages to be too great a sacrifice is willing to forego one-half to secure an education which does not interfere with the acquisition of the knowledge essential to his power of maintaining himself at an early age.

The children are never weary of school or work. Their progress is very nearly equal to that of those whose sole business is attending school.

At fourteen years they have acquired the rudiments of school-learning, a knowledge of the business of life, and enter into service with all that skill combined with hardihood which the farmer who hires them has a right to expect. They are much better servants than mere school-boys.

Their school life being compared, not with a holiday, but with a day of labour, they look upon it as a rest; and their associations with books are not irksome, but agreeable, so that they retain what they have acquired. They attend regularly, and, remaining to a later age, their attainments are higher, and they give a higher tone to the school.

Mr. Spencer, the master of our Free School, declares that any master who has experienced the benefits of the system will be very unwilling to forego them.

In October, 1858, I examined three of the boys now on my farm, who have been upon this system a considerable time, and who are about to leave school; two being thirteen, and one just 14 years of age. They all read intelligently and well. They wrote from dictation,

from a book not previously seen, in a clear hand and with few mistakes.

I found them quite familiar with the first four rules of arithmetic, and reduction and compound multiplication.

The labouring classes voluntarily adopt this system in their own arrangements. In addition to sixteen, who are working as pairs in agricultural labour, there are several pairs employed in the winding and seaming, belonging to the stocking manufactory, and several girls, who assist the mother in her domestic duties alternately; and in both these cases the system works very satisfactorily.

Where, in close parishes, the possessors of estates compel the labourers to live in adjoining villages, in order that they may keep down their poor rates, there may be difficulty in providing pairs in sufficient number for the farmers; but this evil, arising from the law of rating, must ere long attract the attention of the legislature.

This alternate system of labour and rest appears to be natural, the activity of the body is a good preparation for the activity of the mind.

The principle admits of a very wide application. Already a manufacturer in Nottingham has adopted it with satisfactory results to forty boys in his employ; and I believe that our middle classes might give their sons, up to the age of 20, an alternation of a day of college and gymnastic exercises, with a day in the counting house; and thus confer upon them that inestimable boon, a sound mind in a healthy frame.

TANGIBLE ARITHMETIC FOR THE BLIND.

The following is the description of an apparatus contrived by the Rev. William Taylor, F.R.S., by the aid of which blind persons may be enabled to solve questions in common arithmetic, and also in Algebra:—

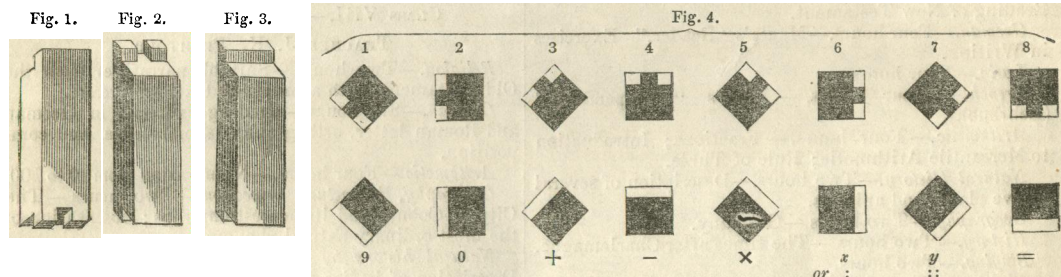


Fig. 5. The contrivance consists of a sort of board of gutta percha, half an inch thick and of any convenient size, the smallest being three inches and a half wide and seven long. It contains 128 octagonal holes, into which square pegs are to be placed to represent numbers, &c. The pegs are one-sixth of an inch square and three-eighths of an inch long. At one end there are two small projections about one-tenth of an inch high; at the other end one projection continues the whole width of the peg. These serve to show which end of the peg is uppermost, and its position in the hole. Fig. 1 represents the peg; figs. 2 and 3 the different ends; fig. 4 shows the sixteen positions of the peg in the holes. Between the holes there are saw-cuts (one-eighth of an inch deep) across the board, dividing it into as many squares. Into these saw cuts small strips of tin are inserted, to serve as *lines* or *vincula*. They are of various lengths, and some of them have a notch near the end, on one side, and two notches on the other, as in fig. 5, and some are plain. When these tins are placed over one or more algebraical quantities, with the single notch to the left-hand, it represents the *square root* of those quantities,

and when the notch is to the right-hand, the *square* of them. The *cube* and its *root* are similarly indicated by the *double notch*. Other tins with different notches may serve for other powers and roots. The plain or unnotched tins serve to separate fractions, &c., and for lines in common arithmetic between sums and their answers. When several pegs are placed in adjacent holes, from left to right, the one on the right represents *units*; the next towards the left *tens*; the next, *hundreds*, &c. To represent any number, place a peg in one of the holes, in the position indicated by that number in fig. 4. Should the number consist of two or more figures, two or more pegs must be placed in as many adjacent holes, and in the positions represented by those figures in fig. 4. If a fraction be intended, place the figures in holes one above another, with a strip of tin in the saw-cut between them. *Example*: To represent the number 3728, seek in fig. 4 the number 3, and place a peg in one of the holes in the position there represented; in the next hole, to the right, place a peg as represented by the No. 7 (fig. 4), &c., till the number be completed. The *x*, *y*, *z* may be used for any other letters, as *a*, *b*, &c., at pleasure. $2a + 3b$ with a tin over, having the notch to the *left-hand* would signify $\sqrt{2a + 3b}$, and to the right, $2a + 3b^2$, &c. Between pounds,

shillings, pence, &c., a hole is to be left unoccupied, and in "*Proportion*," two holes may be left in the middle. In Algebra, when the question does not involve more than three unknown quantities (a greater number would require an additional and differently marked peg), the quantities will be set down according to the positions found in fig. 4. The pegs may be made of any material, but cast in type-metal they are the cheapest. It will be observed that when the side of a peg is parallel to the side of the board, an *even* number is represented, and when otherwise, an *odd* number.

In carrying out the above contrivance, Mr. Taylor is indebted for many valuable hints to Mr. Abraham Pope, of No. 80, Edgeware-road, where the apparatus complete may be had.

Home Correspondence.

EXHIBITION OF 1861.

In the "summary of information bearing upon the Exhibition of 1861," which appeared in the last number of the *Journal*, I observed, with some surprise, that the Great Exhibition held at New York in the 1853 was left out of your correspondent's calculations, in consequence, as he stated, of its having been entirely a private enterprise.

If this is a correct description of the New York Exhibition, it would be equally correct to designate as private enterprises the greater number of the other Exhibitions which your correspondent enumerates, and from which he derives his arguments. But, without attempting to enter upon any vindication of the public character of the New York Exhibition, I desire to draw attention to the fact that, so great was the interest felt in that Exhibition by our own fellow subjects resident in Canada, that one hundred thousand Canadians visited it, and recorded their names as visitors in a book kept for that purpose by the Commissioners, and now in the possession of the Canadian Government.

The New York Exhibitions exercised the most important influence for good upon the manufacturers of Ireland. This influence was no less opportune than advantageous, for the period was a critical one for Ireland, when even the ablest and most enterprising of her sons appeared to have lost all confidence both in themselves and in the future of their country.

The manufacturers of Ireland, who were large contributors to the New York Exhibition, at that time actually attached continental "trade marks" to their productions, under the impression that if they were known to be "Irish," there was no hope of their being estimated according to their worth.

It is a significant illustration of the public, and, indeed, of the national effect of that strictly "private enterprise," that in one single branch of Irish manufactures, namely, embroideries, there was an increase of upwards of one million of dollars on the exports to America, between June, 1852, and June, 1853, as compared with the previous averages; and to this statement it may very consistently be added, that the same statistical tables exhibit, during the same year, a general increase of more than 40 per cent. in the American importations of Irish linens; and this increase was still greater in the following year.

These appear to me to be arguments in support of International Great Industrial Exhibitions, worthy to be associated with your correspondent's "summary," since they bear in the most direct manner, and with no trifling authority, upon the question under consideration.

I am, &c.,

SAMUEL MARSHALL.

Westow Hill cottages, Upper Norwood,
Surrey, April 6th, 1859.

MR. VARLEY'S PAPER ON THE ELECTRIC TELEGRAPH.

Sir,—I find, in looking over the *Journal* of last week, containing the report of my paper on the practical bearing of the theory of electricity in submarine telegraphy, that some mistakes have occurred, which I appear to have overlooked when correcting the proof.

At page 310, column 1, line 51, after the word "material" there should be inserted, "or by using a wire of larger diameter."

In line 61, the weight of the conducting machine should be "93lbs. to the mile," not "63 lbs."

In the bottom paragraph of the same column, the words should be "a conductor of double the diameter will possess half the retarding power," and not "produce," as in the *Journal*. The price given in the same paragraph lower down, should be "not more than £19 per mile," instead of "£16." I am, &c.,

S. ALFRED VARLEY.

April 6, 1859.

PRODUCTS OF THE COMBUSTION OF COAL GAS.

Sir,—In the *Journal* for the 18th of March, there is a reply by Dr. Letheby to my observations on his letter on the subject of the formation of oil of vitriol by the combustion of coal gas. I should not otherwise have made any further observations on the subject, as I believe no one really is of opinion that coal gas has the awful effects attributed to it by Dr. Letheby, or that it is matter of common observation that all kinds of textile fabrics are rapidly destroyed by it. Speaking for myself and friends who have burnt gas for many years, we find our curtains, books, furniture, pictures, &c., last as long as those who do not burn gas at all in their apartments.

I can assure Dr. Letheby it is the wish of all gas companies to discover a means of abstracting the very small portion of sulphur which is left in the gas after it has undergone the processes at present known for that purpose; and I can promise Dr. Letheby, if he, as a chemist, can devise some plan to effect this, he will do far more good than by an attempt to decry one of the most useful inventions of modern times.

I do not intend to put my knowledge against Dr. Letheby's; he may have a method of making oil of vitriol known only to himself. I can only say, I have tried every possible way for the last five years, and up to the present time have not succeeded in obtaining one drop of oil of vitriol from the combustion of coal gas as burnt in the ordinary way.

Dr. Letheby informs you he is in the daily habit of analysing coal gas. By this, I presume, he means both pure and foul gas, or, as he terms it, raw gas; and he quotes Mr. Wright as an authority in support of his view, viz., that raw gas does not contain as it comes from the condenser more than $\frac{1}{1000}$ part of its bulk of ammonia. Now, without being a chemist, I beg distinctly to contradict Dr. Letheby as to the quantity stated. Ordinary foul gas in that stage of the process contains sufficient ammonia to saturate more than one pound of oil of vitriol per 1,000 feet of gas, or considerably over one per cent. of the weight of gas; this amount is daily used at this and other gas works, and the whole of the ammonia is even then not abstracted, sufficient being left in to neutralise any sulphur compounds still existing in the gas.

Mr. Wright informs me he did not use the expression raw gas, as quoted by Dr. Letheby, nor did his experiments have reference to anything else but purified gas, as may be easily ascertained by reading the whole of the article he wrote on the subject.

The statement of Dr. Letheby, that the whole of the ammonia is destroyed during the combustion of the gas, is not supported by my experiments; in fact, as has long since been pointed out by Mr. Lewis Thompson, when

gas absolutely free from ammonia is operated upon for the purpose of ascertaining roughly the amount of sulphur compounds it contains, we purposely add ammonia to it, in order that sulphate of ammonia may be formed, and thus the amount of sulphur ascertained.

I am, &c.,
F. J. EVANS.

Gas Works, Horseferry road, March 26th, 1859.

Proceedings of Institutions.

SALFORD ROYAL MUSEUM AND LIBRARY.—The tenth Annual Report states that the Institution has been fully as attractive as in any former year. In the spring of last year, the basement story of the new wing was completed, and the mineral and geological specimens are now placed in it. The room on the ground floor has been also finished, and other improvements have been made. The Museum is much indebted to Sir James Watts, late Mayor of Manchester, for his very handsome present of four paintings, by ancient masters. On the completion of the rooms of the new wing, the Committee determined to have an Exhibition, for the summer months, of the paintings, engravings, chromo-lithographs, statuary, and other works of art belonging to the institution, which they accordingly arranged, and to which many additions were made from private collections. The following table shews the number of visitors to the Museum for the last twelve months.

MONTHS.			QUARTERS.		
	Days Opened.	Visitors.	Days Opened.	Visitors.	Daily Average.
1857—November.....	21	16,100	66	79,600	1,200
December.....	23	23,200			
1858—January.....	22	40,300	64	126,561	1,961
February.....	20	40,800			
March.....	23	38,700	63	190,120	2,795
April.....	21	47,064			
May.....	23	93,180	67	142,160	2,121
June.....	23	53,040			
July.....	22	44,900			
August.....	22	51,800			
September.....	22	46,860			
October.....	23	43,500			
	265	538,444	Daily average ...		2,032

The total number of volumes issued from both departments of the Library, during the last twelve months, have been—From the Reference, 86,418 volumes, Lending, 75,256—total, 161,674. There is a slight increase in the former department of 2,076 volumes over last year, and 6,484 when compared with 1856; but the operations of the Lending Library have been so much extended, as to make the number of volumes issued to be nearly 20 per cent. more than the highest return of former years,—the actual numbers are 11,784 over 1857, and 12,706 over the previous year. There have been added 1,208 volumes by donations, and 660 by purchase, so that the Library now contains 22,371 volumes, classified as follows:—Theology and Ecclesiastical History, 1,071; Jurisprudence, Political Economy, Parliamentary Papers, and Blue Books, 3168; History, Travels, and Biography, 6,370; Science and the Arts, 3,916; Poetry and Drama, Magazines, Essays, Periodicals, Reviews, and Translations of the Classics, 3,799; Novels, and all Works of Fiction, 4,047; Total, 22,371. The following are the numbers issued under each head during the last three years:—Theology and Ecclesiastical History, 1856, 2,338; 1857, 3,421; 1858, 4,449; Jurisprudence, Political Economy, Parliamentary Papers, and Blue Books, 1856, 900; 1857, 1,631; 1858, 1,699; History, Travels, and Biography, 1856, 14,395; 1857, 16,217; 1858, 13,774; Science and the Arts, 1856, 15,035; 1857, 17,212; 1858, 13,730; Poetry and Drama,

Magazines, Essays, Periodicals, Reviews, and Translations of the Classics, 1856, 23,512; 1857, 23,459; 1858, 23,800; Novels, and all Works of Fiction, 1856, 23,754; 1857, 22,582; 1858, 23,996; Total, 1856, 79,934; 1857, 84,342; 1858, 86,418. The Specifications of Patents, to which 5,257 references have been made during the year, principally by mechanics, now number 28,047 separate Specifications, and when bound will make 1,100 volumes. In the Lending Library the following have been the issues:—Theology, and Religious Tract Society's Publications, 1856, 2,923; 1857, 3,734; 1858, 3,450; History, Travels, and Biography, 1856, 10,666; 1857, 12,304; 1858, 13,197; Science and the Arts, 1856, 6,737; 1857, 7,284; 1858, 3,694; Poetry and Drama, Magazines, Essays, Reviews, Periodicals, and Translations of the Classics, 1856, none; 1857, none; 1858, 4,242; Novels, Tales, and all Works of Fiction, 1856, 42,324; 1857, 40,150; 1858, 50,693; Total, 1856, 62,550; 1857, 63,472; 1858, 75,256. From statistics compiled by the librarian as to the occupations of those making use of the library, three-fourths of them are strictly belonging to the working classes, the numbers being, from March 1st, to October 31st, 1858,—Females (mostly young) 466; youths under sixteen years of age, 399; journeymen, workmen, shopmen, mechanics, &c., 667; clerks, warehousemen, schoolmasters, and teachers, 308; soldiers, 125; policemen, and persons of no trade or calling, 51; total, 2,014. The borrowers take great care of the books, and for the most part return them regularly. No case of wilful damage has occurred, and very few accidental ones. The Library has increased from 7,000 volumes, in 1850, to 22,371, in 1858. The Committee state that they are quite satisfied with the working of the Reference and Lending Departments of the Library, and call attention to the foregoing statistics, as shewing the increasing popularity and usefulness of the Institution; and inasmuch as the Lending Library is now amply supplied with books well adapted for it, they recommend their successors to expend a greater proportion of the funds at their disposal, than heretofore, in the purchase of standard works of a high class, for the Reference Library.

WINDSOR AND ETON LITERARY, SCIENTIFIC, AND MECHANICS' INSTITUTION.—A lecture was delivered at this Institution on Tuesday evening, the 8th of February, by William Johnson, Esq., of Eton College, on Sir Walter Scott. After noticing that an exception was made in favour of the novels of Sir Walter Scott by many persons who objected to novel reading in general, the lecturer proceeded to inquire to what merit Scott owed this distinction, and he thought it consisted in his generosity and manliness of mind. Before Scott, the historical novel could not be said to exist, and he was not so likely to mislead as many novelists who had succeeded him. The lecturer proceeded favourably to contrast Scott as a novelist of this class with Bulwer and Alexander Dumas. The mistakes made by Scott were merely those of carelessness. He was not, however, so successful in delineating the manners and domestic scenes of common life as Miss Ferrier, Miss Austen, and other ladies who had adopted that description of novel. His *St. Ronan's Well* was referred to as an instance of this. There was no excessive nationality displayed in his works, although he was a most patriotic writer, and made Scotland classic ground. Scott was in general liberal in describing parties from whose political and religious views he differed. One man might be compared with Scott in extent of knowledge, Lord Macaulay, and the comparison could be easily made by referring to the notes to Scott's edition of Dryden's *Political Satires*, which had reference to a period of which Lord Macaulay treated. The lecturer reviewed the life of Scott, marking the periods at which his poetical works were produced, referring to his flattering receptions in London and Paris when in the zenith of his fame, and describing his subsequent misfortunes, and

the strenuous exertions made by him after his bankruptcy to clear off his debts, no less than fourteen hours a-day being spent by him continuously in literary labour. At the close of the lecture the thanks of the audience were tendered to Mr. Johnson, by Captain Wilson, one of the Vice-Presidents of the Society.

MEETINGS FOR THE ENSUING WEEK.

MON. London Inst., 7. Mr. John Ella, "On Chamber, Orchestral, and Ballet Music."

Medical, 8.

Geographical, 8½. 1. Commander Bedford Pim, R.N., "Brief Remarks upon the Isthmus of Suez, with special reference to the Proposed Canal, &c." 2. Sir J. Herschel, Bart., "On a New Projection of the Sphere," communicated by Sir R. I. Murchison. 3. Communication by Major T. Stokes, R.E., "Notes on the Lower Danube."

TUES. Royal Inst. 3. Professor Owen, "On Fossil Mammals." Syro-Egyptian, 7½. 1. Mr. Sopwith, "Information regarding the Sixty-four Apis found in the Vault of the Serapium." 2. Mr. Bonomi, "Explanation of the Mode in which the Granite Sarcophagi which contained the Mummy of the Apis was lowered into its place in the Vault of the Serapium, and of the means proposed by Mr. G. Stephenson for raising it."

Civil Engineers, 8. 1. Discussion "On the Permanent Way of the Madras Railway." 2. Mr. W. J. Kingsbury, "Description of the Entrance, Entrance Lock, Wrought-iron Gates and Caisson of the Victoria (London) Docks."

Medical and Chirurg., 8½.

Zoological, 9.

WED. Literary Fund, 3. Society of Arts, 8. Mr. H. Hyde, "On Professor Hughes's System of Type-printing Telegraphs and Methods of Insulation, with special reference to Submarine Cables." Graphic, 8.

Archæological Assoc., 8½.

THURS. Royal Inst., 3. Prof. Tyndall, "On Pneumatics."

Royal Sec. Club, 6.

London Inst., 7. Professor Bentley, "On Vegetable Substances used for the Fool of Man."

Antiquaries, 8.

Philological, 8.

Royal, 8½.

FRI. United Service Inst., 3. Dr. W. Farr, "On the Application of Statistics to Naval and Military Matters." Royal Inst., Meeting, 8; Lecture, 9. Sir Charles Lyell, "On the Consolidation of Lava on Steep Slopes, and on the Origin of the Conical Form of Volcanoes."

SAT. Royal Inst., 3. Mr. J. P. Lacaita, "On Modern Italian Literature."

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

PAR. NO.

Delivered on 3rd March, 1859.

99. Manning the Navy—Copy of Letter of W. S. Lindsay, Esq.
6. Railway and Canal Bills: 80, Border Union (North British) Railways; 109, Birkenhead, Lancashire, and Cheshire Junction Railway; 110, London and North-Western Railway (arrangements)—Board of Trade Reports.

50. Bill—Endowed Schools (No. 2).

Delivered on 4th March, 1859.

83. Landed Estates Court (Ireland)—Copy of Rules and Orders.
89. Committee of Selection—2nd Report (a corrected copy).
95. Lunatic Asylums (Ireland)—Return.

98. Magistrates (County Palatine of Lancaster)—Return.

103. Clothing (Army)—Return.

Delivered on 5th and 11th March, 1859.

31. Seamen and Marines Invalided—Return.

105. Corn and Grain, &c.—Accounts.

108. Navy—Supplementary Estimate.

6. Railway and Canal Bills (111, Border Counties Railway; 112, Carlisle, Langholm, and Hawick Railway; 113, Great North of Scotland Railway; 114, Leatherhead and Dorking Railways (No. 2); 115, London and North Western and other Companies (Working and Traffic Arrangements); 116, London and South Western Railway Act Amendment; 117, Liverpool, Garston, and Allerton Railway; 118, Manchester, Sheffield, and Lincolnshire Railway (Sale or Lease); 119, Metropolitan Railway (Abandonment of Undertaking); Metropolitan Railway (Deviations, &c.); 120, Newcastle under Lyme, Silverdale, and Madeley Junction Railway; 121, Nuneaton and Hinckley Railway; 122, Portsmouth New Docks and Railway; Portsmouth Railway; 123, Sittingbourne and Sheerness Railway (Working Arrangements, &c.); 124, Somerset Central Railway; 125, Ulster Railway; 126, Victoria Station and North Western and Great Western Junction Railway

127, West End of London and Crystal Palace Railway (No. 1); West End of London and Crystal Palace Railway (No. 2); 128, Wimbledon and Dorking, and Epsom and Leatherhead Railways; 129, Great Western Railway)—Board of Trade Reports.

50. Local Acts (29, Victoria Station and North Western and Great Western Junction Railway; 30, West London Railway; 31, South Metropolitan Railway and Westminster Station; 32, West London and Pimlico Railway; 33, North London, Paddington, Richmond, &c., Railway; 34, Victoria Station and Pimlico Railway; 35, Swanage Railway and Pier; 36, Llynfi Vale Railway and Harbour)—Admiralty Reports.

80. Harbour, &c., Bills (2, Fishguard Harbour Improvement; 3, Forth and Clyde Navigation; 4, Greenwich and South Eastern Docks; 5, Isle of Wight Ferry; 6, Kingston upon Hull Docks; 7, Kirkwall Harbour; 8, Victoria (London) Docks; 9, Whitehaven Port, Harbour, and Town, &c.; 10, King's Lynn Borough and Port Harbour Improvement; 11, Tyne Improvement; 12, Weymouth and Melcombe Regis Markets and Pier)—Board of Trade Reports.

52. Bills—Petitions of Rights.

53. " Affidavits by Commission.

54. " Titles to Landed Estates (amended).

55. " Registry of Landed Estates (amended).

56. " Municipal Elections (amended).

57. " East India Loan.

58. " County Courts.

59. " Newspapers, &c. (amended).

62. " Remission of Penalties.

SESSION 1857-8.

98 (A XII). Poor Rates and Pauperism—Return (A).

Delivered on 8th March, 1859.

17. Police (Counties and Boroughs)—Reports of the Inspectors.

40. Local Acts (37 Sued Fisheries)—Admiralty Report.

94. Superannuations—Copies of Order in Council and Treasury Minutes.

101. Customs, Excise, &c.—Returns.

111. Slave Trade (Zanzibar)—Returns.

Delivered on 9th March, 1859.

6. Railway and Canal Bills (130, Chester and Holyhead Railway); 131, Isle of Wight Railway (Eastern Section); 132, Lancaster and Carlisle Railway; 133, Liverpool Stations Junction Railway (No. 2); 134, North and South London Junction Railway; 135, North Staffordshire Railway; 135, Oldham, Ashton-under-Lyne, and Guide Bridge Railway (Working of Line, &c.); 137, Sichoway Tramroad; 138, South Staffordshire Railway (Supplemental Report); 138, Vale of Neath Railway—Board of Trade Reports.

80. Harbour, &c., Bills (Commercial Docks Act Amendment)—Board of Trade Report.

109. African Mails—Copy of Correspondence.

11. Charity Trustees—Return.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[From Gazette, April 1, 1859.]

Dated 16th December, 1858.

2880. R. Wilson, sen., and R. Wilson, jun., Livesey street, Manchester—Certain imp. in the preparation of leather in combination with india rubber and other materials, for the manufacturing of hose pipes and other purposes where leather is required to be impervious to water, steam, or frost.

Dated 19th February, 1859.

460. T. Eadie, Clapham, Surrey—Improved apparatus for conveying signals to railway trains in motion.

462. W. Basford, Burslem, Staffordshire—Imp. in the method of, and means for, drying bricks and tiles preparatory to their being burnt, and also in the construction of kilns or ovens for burning such bricks, tiles, pipes, pottery, or earthenware, and in the mode of charging or placing these said articles therein to be burnt or fired, and also in certain appliances for regulating the heat therein.

Dated 25th February, 1859.

516. G. Peover, Wilmington-square, Clerkenwell—An improved optical instrument, being an improvement upon the kaleidoscope.

Dated 8th March, 1859.

600. J. King and A. Wilcock, Moss Mill, near Rchdale, Lancashire—Imp. in certain parts of machines used in preparing, spinning, and doubling cotton and other fibrous materials.

602. W. Halliday, Wakefield—Imp. in apparatus for preventing smoke and economizing fuel.

604. C. Mills, High-street, Camden-town—Imp. in the action of pianofortes.

606. E. Deane, 1, Arthur-street East, London Bridge—Imp. in apparatus for the transmission of gas and other fluids.

608. B. M. Belling, 55, Queen's-road, Bayswater—An improved apparatus for hardening india rubber for the bases of teeth.

Dated 9th March, 1859.

610. J. A. Williams, Baydon, Wiltshire—Imp. in machinery or apparatus for cultivating land by steam power.

612. J. R. Nicholson, Redditch, Worcestershire—New or improved machinery to be used in the manufacture of needles, a part or parts of which said machinery may also be used for pointing pins and other like articles.

614. G. C. Pearce, Cyfarthfa, Glamorganshire—An imp. in cornets, trumpets, trombones, and other like wind instruments.

618. W. E. Newton, 66, Chancery-lane—Imp. in billiard tables. (A com.)

Dated 10th March, 1859.

620. J. C. Martin, High-street, Barnes, Surrey—An imp. in the manufacture of cannon and small fire-arms, and of projectiles to be used with the same.

622. R. F. Woodward, Birmingham—An imp. or imps. in the manufacture of certain kinds of scale beams and fittings used therewith.

Dated 11th March, 1859.

624. J. H. Burton, Enfield Lock, Middlesex—An imp. in breech-loading fire arms.

630. A. V. Newton, 66, Chancery-lane—An improved construction of steam engine, applicable also to the raising of water. (A com.)

Dated 12th March, 1859.

632. W. E. Newton, 66, Chancery-lane—An imp. in endless chain propellers for boats and other vessels. (A com.)

638. R. Allison, Birmingham—Imp. in apparatuses for boring and sinking.

Dated 14th March, 1859.

640. R. Waller, 50, Baker-street, Portman-square—Imp. in joining leather, flexible and textile materials, for the production of boots and shoes, and articles of the like description, and harness, strapping, bags, sails, tent covers, portmanteaus, and such other articles, together with machinery and apparatus for that purpose.

642. A. Tylor, Warwick-lane, Newgate-street—Imp. in apparatus for regulating the supply of water to water closets and other vessels.

644. D. Jey, Leeds—Imp. in hydraulic engines and meters.

646. E. Smith, Dudley Port, Staffordshire—Imp. in treating or preparing furnaces used in the manufacture of iron.

648. J. S. Davies, Smethwick-house, near Birmingham—A new or improved method, or combination of arrangements for the better securing and collecting of night-soil or town manure, and rendering it more valuable for agricultural purposes.

Dated 15th March, 1859.

650. C. Desurmont, Seclin, France, and C. Goudeau, Alost, Belgium—Certain imp. in looms for weaving.

652. C. Ritchie, 143, Strand—Imp. in calculating machines.

654. B. Rider, 61, Red-cross-street, Borough—Imp. in hats, caps, and other coverings for the head, and in the apparatus used in the manufacture of such articles.

Dated 16th March, 1859.

655. J. Dixon and R. Clayton, Bradford—Imp. in rolling iron and steel for manufacturing railway wheels and for other purposes.

657. W. Robertson and J. G. Orchar, Dundee—Imp. in weaving.

659. J. Parker, Claremont cottage, Lilford road, Camberwell, Surrey—Imp. in lever sails, and in submerged feathering propellers.

661. F. Mordan, Goswell-road, Middlesex—A means of keeping a stopper connected with a bottle, jar, or such like receptacle, when removed from the mouth thereof.

663. J. Fuller, Reading, Berkshire—Imp. in churns.

665. J. Michel-Denys, 4, South-street, Finsbury—Certain imp. in the construction of railway crossings.

669. G. Hamilton, St. Martin's-le-Grand, and W. H. Nash, Poplar—Imp. in tumbler or lever locks, and in keys for such and other locks.

671. T. W. Miller, H.M. Dockyard, Portsmouth—Imp. in blocking or securing ships and other vessels whilst being removed, examined, or repaired.

Dated 17th March, 1859.

673. C. Garnett, Cleckheaton, Yorkshire—Imp. in machinery for ginning cotton, and for cleaning cotton and certain other fibrous materials.

675. E. T. Hughes, 123, Chancery-lane—Imp. in machinery or apparatus for crushing sugar-canes and other materials. (A com.)

677. T. Skelton, Plaistow, Essex—Imp. in steering apparatus.

679. P. Laroquette, Paris—Imp. in machinery for brewing.

681. A. Warner, 31, Threadneedle-street, and W. H. Tooth, Summer-street, Southwark—Imp. in the manufacture of iron.

Dated 18th March, 1859.

683. W. Cook, Kingston-upon-Hull—A smoke consumer.

685. Sir W. G. Armstrong, Knt., Newcastle-upon-Tyne—Imp. in the means of igniting explosive projectiles.

687. J. Molesworth, Rochdale—An imp. in telegraphic communication. (A com.)

689. J. Hinks and G. Wells, Birmingham—A new or improved penholder.

691. R. Mushet, Coleford, Gloucestershire—An imp. in the manufacture of cast steel.

693. C. Lambert, Sunk Island, Yorkshire—Imp. in corn and seed drills.

Dated 19th March, 1859.

695. T. Allen, Waingate, Sheffield—Imp. in petticoats.

697. E. L. Benzon, Sheffield—An imp. in the casting of steel. (A com.)

699. H. Whitaker, Newman street—A new musical instrument, to be called "The Cherubine Minor."

701. W. Haigh, Reddish, Lancashire—An improved manufacture of paper, to be employed for the purposes of packing and other similar uses.

703. R. Mushet, Coleford, Gloucestershire—An imp. or imps. in the manufacture of cast steel.

705. A. V. Newton, 66, Chancery-lane—Imp. in propelling vessels. (A com.)

Dated 21st March, 1859.

707. W. Haggett, Sherborne, Dorsetshire—An improved method of treating metals and other materials to increase their strength.

709. W. Hudson and C. Catlow, Burnley, Lancashire—Certain imp. in looms for weaving.

711. G. Ferguson, Strand—The combination and application of certain materials for the destruction of insects and vermin.

713. S. Leoni, Saint Paul-street, Middlesex—Imp. in the manufacture of useful and ornamental articles, surfaces, and works, parts of articles and parts of machinery or apparatus, from talc and other silicates of magnesia, and from the same combined with other substances.

715. G. Gregg, Sheffield—Imp. in currying or manufacturing leather.

717. W. Rhodes, Wade-street, Thornton-road, Bradford—Certain imp. in fire proof safes.

Dated 22nd March, 1859.

719. J. Davis, 18, Frith-street, Soho—Imp. in musical instruments.

721. W. A. Gilbze, 4, South street, Finsbury—An improved apparatus for stretching and polishing silk thread. (A com.)

723. F. Ashford, Commercial road East, London—Improved means of fastening and securing treasure or bullion cases.

725. E. Maynard, Washington, U.S.—Improving breech-loading fire-arms.

729. Sir P. Fairbairn and R. Newton, Leeds—Straightening and separating the fibres of silk waste, and laying them in parallel lengths preparatory to combing or dressing.

731. R. A. Brooman, 106, Fleet-street—Imp. in fire-arms and ordnance, and in projectiles and apparatus to be employed therewith. (A com.)

733. C. A. Watkins, Greek-street, Soho-square—Imp. in the manufacture of brushes.

INVENTION WITH COMPLETE SPECIFICATION FILED.

780. W. Mossman, 50, Cumming-street, Pentonville, Clerkenwell—Imp. in machinery applied to embossing or cutting presses, for the better and more expeditious manner of manufacturing ornamental cut out and embossed work in paper, leather, parchment, cloth, foil, and other materials.—29th March, 1859.

WEEKLY LIST OF PATENTS SEALED.

[From Gazette, April 1, 1859.]

<i>April 1st.</i>	2364. R. Kennedy and J. Armstrong.
2194. W. Brierley.	2372. W. B. Newton.
2198. J. C. Holman and E. W. Holman.	2376. J. J. Welch and J. S. Margetson.
2206. J. Mills.	2383. S. R. Parkhurst.
2207. A. Bessemer.	2406. A. Heywood.
2209. W. Menelaus.	2409. W. Munro.
2211. J. H. Brown.	2436. W. Palmer.
2213. J. H. Brown.	2439. M. A. F. Mennons.
2219. G. Collier.	2479. W. Morgan.
2223. W. Malam.	2987. T. Bell.
2225. C. Baylis.	68. E. Cobbold.
2230. D. Naylor.	147. W. Newman.
2248. A. E. Galliard.	249. H. Rawson.
2251. L. Hope.	250. J. Buckingham and G. Salt.
2292. W. Clark.	302. J. Buncher.
2296. T. Archer.	326. Patrick Adie.
2303. T. Moore.	352. Dr. E. Bagnicki.
2307. G. F. Wilson.	

[From Gazette, April 5, 1859.]

<i>April 5th.</i>	2234. J. Luis.
2137. A. F. Jaloureau.	2243. C. W. Lancaster.
2212. G. Hamilton and W. H. Nash.	2252. W. Crofts.
2217. J. Luis.	2301. W. Bacon.
2226. D. Nicoll.	2337. R. A. Brooman.
2229. J. C. Nouveau.	2388. T. Almond.
	333. R. Tinkler.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[From Gazette, April 1, 1859.]

<i>March 28th.</i>	902. W. Fuller.
786. J. Gray.	908. A. V. Newton.
923. W. Tytherleigh.	<i>March 30th.</i>
<i>March 29th.</i>	1024. J. Rigby.
770. B. Looker.	

[From Gazette, April 5, 1859.]

<i>April 1st.</i>	827. J. Bernard.
801. J. Samuel & J. Nicholson.	838. J. Leigh.
818. C. W. Ramie.	915. Capt. H. Y. D. Scott, R.E.
833. F. G. Underhay.	949. F. W. Blacket.
<i>April 2nd.</i>	
820. J. G. Martien.	